to gravity is seen in the hanging position which the larva then assumes.

Valuable assistance in these observations was given by several of my pupils in Milton Academy.

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Anopheles in California, with Description of a New Species.

By Isabel McCracken, Stanford University, Cal.

(With Plate II.)

In September, 1901, I began to look for individuals of the mosquito genus *Anopheles* in the vicinity of Stanford University. The University is situated near the base of the San Francisco peninsula, which is thirty-five miles long and about twenty-five miles broad at its base, and extends north and south between the Pacific Ocean and a long southern arm of the Bay of San Francisco. Running its full length about midway between ocean and bay is the Santa Cruz (or Sierra Morena) Range of mountains, the altitude of the crest being about 2,500 feet in the south, and only slowly decreasing in altitude toward the north. My collecting ground, in the vicinity of the villages of Menlo Park, Palo Alto, Mayfield and of the University, has been on the bay side of these mountains in the southern or basal portion of the peninsula.

The locality is not a malarial region. Several cases of malaria have been reported by resident physicians, but it appears, upon inquiry, that each patient so reported had either recently been away from the town or had recently come from a distance.

The various lakes, pools, streams and troughs in the neighborhood were visited continuously from September 5 to December 1, 1901, and again from March 1 to May 10, 1902, at intervals of a week or two.

Anopheles punctipennis and *Anopheles maculipennis* were found at various times and in various places, *A. maculipennis*

having the wider range and being more abundant in this limited area.

The following table gives the distribution, association and date of finding:

	Date	Species.	Locality	
1	Sept. 5 01	A. punc. L.	Francisquito Cr.	With Culex (species not identified.
2	" 7	" " L.&P	Flume	Abundance of Algæ.
3	" 12	" " "	Francisquito Cr.	Without Culex (opposite side of stream from 1.
4	" 19	" " & mac. L	"	A mile or so below where 1 and 3 were found.
5	" 19	A. mac. L & P	Pasturage Trough	With Culex incidens.
6	" 29	" " "	" "	A mile or so west of trough where 5 were found.
7	" 29	" " L	Flood Lake	With Culex tarsalis.
8	Oct. 5	A. punc. & mac. L	Pasturage Trough	Same as 6.
9	" 5	A. mac. L	" "	A mile or so east of trough where 5 were found.
10	" 5	" " L & P	" "	In a field on opposite side of road from 9.
11	" 6	" " L, P & E	Tank overflow	With Culex tarsalis.
12	" 6	A. punc. L & P	Francisquito Cr.	100 yds. or so above where 4 were found, in foul water.
13	" 12	A. punc. L & P	Los Francos Cr.	About a mile above where it enters Francisquito, with Dixa.
14	Nov. 1	" " L, P & E	Francisquito Cr.	About a mile above where it is joined by Los Trancos, with Dixa.
15	" 5	A. mac. L & P	Tank overflow	With Culex tarsalis and Dixa.
16	" 8	"	Felt Lake	With Dixa.
17	" 17	"	" "	" and Culex tarsalis.
18	Mar. 14 02	"	Tank overflow	Same as 11, with dragon-fly and beetle larvæ and tadpoles.
19	" 28	A. mac. L	Felt Lake	With dragon-fly larvæ
20	April 8	" " L & P	Roadside pool	Near where 9 were found last year—not so abundant—tadpoles.
21	" 8	" " L	Frenchman's Lake	
22	May 3	" " L & P	Felt Lake	

The collecting points were all within four miles north or south of the University, and within six and a half miles of each other. Felt Lake, the farthest point in one direction, is between 200 and 325 feet above sea level. It is a reservoir that lowers during the summer months below its outlet, but does not dry out entirely. Flood Lake, the farthest point in the opposite direction, is within a half-mile or so of tidewater and usually dries out during the summer months. *A. maculipennis* was found in both. The troughs visited contain water all the year round. The creeks frequently dry out during the summer months. The tank overflow has been permanent. Frenchman's Lake is a small reservoir that dries out.

At no time or place were the larvæ of either species very abundant. No adults were seen flying except on the evening of April 23, 1902, in the neighborhood of Francisquito Creek, in the willows and alders, when they were quite abundant.

The larvæ were, with one exception, found in comparatively clear water. On October 6, 1901, *A. punctipennis* was found in the creek, in very foul water.

On September 29th, 1901, a few full-sized larvæ and several pupæ were brought to the laboratory from Felt Lake. A few days later the adults issued, and proved to be an unidentified species.

This species was found continuously in small numbers at Felt Lake from October 5th to November 8th, 1901, invariably in company with *Diva*, occasionally in company with *A. maculipennis*, and, on November 8th, with *Culex* eggs that later development proved to be those of a new species, *Culex kellogii* Th., recently described by Theobald (*Canadian Entomologist*, vol. xxxv, p. 211, August, '03).

In general appearance and habits, the larva of this new *Anopheles* is not unlike that of *maculipennis*, as described by Howard ("Mosquitoes," p. 103 *et seq.*), and in greater detail by Nuttall ("Studies in Relation to Malaria," *Jour. of Hygiene*, vol. 1, 1900, p. 51 *et seq.*)

In detail we find, in a fully-grown larva of this species, on the ventral surface of the thorax, three sets of lobes, bearing characteristic hairs: (*a*) a pair on the prothoracic part of the

thorax, bearing four stout, bristle-like, unbranched hairs, three of equal length and one half the length of these; (*b*) a pair on the meso-thoracic part of the thorax, bearing two stout, bristle-like, unbranched hairs, unequal in length; (*c*) a pair on the meta-thoracic part of the thorax, similar to, but shorter than those of *b*. These parts differ somewhat from corresponding parts in other species examined.

The pupa agrees in a general way with the pupa of *A. maculipennis* described by Dr. Nuttall, and with my own observations upon *A punctipennis*. There is to be observed, however, a difference in the character of certain hairs on the posterior lateral margins of the abdominal segments. In the species under observation, these are stout and simple on each segment from the second to the eighth, becoming branched on the eighth, agreeing in this particular with *A. maculipennis*, but not with *A. punctipennis*.

There is also a characteristic difference in the marginal teeth on the posterior fins. In the new species these are short and sharp, and appear in three longitudinal rows, the teeth decreasing in size postero-anteriorly.

It is in the adults, male and female, that the most characteristic difference between species is found, noticeably in the markings of the palpi, the setæ on the genital lobes of males, scales, and the markings of wings on both males and females.

The following is a description of the adult of the new species:

Anopheles Franciscanus n. sp.

Male.—Head dark brown, with short, dark, erect scales toward the nape, emarginate and slightly forked, vertex and anterior part of occiput with short, light brown scales not forked, a tuft of light brown hairs projecting forward between the eyes, a row of similar hairs projecting forward, encircling the eyes posteriorly; eyes deep purplish brown; antennæ about two-thirds length of palpi, yellowish-brown hairs, basal joint dark brown; palpi equalling proboscis in length with emarginate scales from base to tip on under and outer surfaces, those upon outer surface dark, upon under surface light, long light hairs covering distal third, becoming short and stout at

the apex : a light area at base of three distal segments, giving a slightly banded appearance ; two distal joints spatulate, proboscis scaled except labella, labella covered with medium stout setæ, a few light hairs at apex.

Thorax: prothorax lobes dark ; mesothorax dark brown at the sides, with scattered light hairs, a broad light brown patch in the middle ; within this light area a median line and obscure lateral lines ; scutellum light with single horizontal row of hairs ; metanotum dark without hairs ; halteres dark, covered with thick pubescene and emarginate scales ; stalks light without scales.

Abdomen, basal area of each segment light, covered sparingly with long, light hairs ; two stiff hairs on posterior margin of distal segment, stout hairs on margin of genital lobes.

Legs, coxa and trochanter light ; trochanters, femora, tibiæ and tarsi covered with short, dark, emarginate scales and setæ ; ungues of front legs very unequal, the larger one with a large median tooth and a smaller basal lobe ; middle ungues curved, with blunt basal lobes ; posterior ungues equal, simple ; posterior metatarsus slightly longer than tibia.

Wings with dark costa, with two distinct, nearly equal, yellow spots—one at distal end of sub-costal vein, one at and involving distal end of first long vein ; fringe dark, with a yellow spot at the end of each vein except at the end of the sixth ; the first spot carried on to the first long vein, the apical spot carried past over long vein on to the upper branch of the second long vein ; the second long vein dark except for a few basal light scales ; third long vein yellow in the middle, dark at the base and apex ; light area at base of third long vein carried over the fourth on to the upper branch of the fifth, with a few light scales at base ; main branch of fifth long vein light, except at base and apex ; distal half of sixth long vein dark, except at apex, basal half light ; sub-costal with a light spot carried to the the first long vein ; (in one specimen the light spot on sub-costal missing) ; third long vein prolonged slightly into the basal cell ; first sub-marginal cell longer and slightly narrower than second posterior cell, stem twice the length of the cell ; stem of second posterior cell prolonged to base of

wing; supernumerary cross vein adjacent to or but very shortly removed from mid cross-vein and equal to it in length when removed nearer to apex of wing; posterior cross-vein a little longer than mid cross-vein and varying in distance from it from one-half to almost twice its own length; third long vein prolonged slightly into the basal cell, darkest scales on costal, sub-costal and first long veins.

Palpi of the female equalling proboscis in length, light area at base of three distal segments, giving a banded appearance, clothed with scales, short hairs and setæ as in male, distal joints not spatulate; legs with the ungues equal; otherwise agreeing with the male.

This paper was prepared in the Entomological Laboratory of Stanford University, under the direction of Prof. V. L. Kellogg.

Pitcher-Plant Insects.

By Frank Morton Jones, Wilmington, Del.

(Plates III, IV.)

In the rolling sandy country characteristic of the south-central portion of North Carolina, *Sarracenia flava*, the pitcher plant known locally as "fly-catcher" or "trumpets," grows to perfection. Great clumps of its greenish-yellow foliage fringe the ponds or occupy springy places on the slopes and in the hollows. Sometimes single leaves reach a height of more than three feet, but even in favorable situations the average height of the mature and well-developed leaves is not more than twenty-six inches. In August, most of the leaves are tough and mature, their secretion of nectar as a bait for insects seems to have ceased, and evidently the most active period for the capture of insects is over for the year; so that by gathering an armload of the larger leaves and carrying them to some drier, shadier spot for examination at leisure, we may get a very fair idea of the season's catch. The wide upper portion of the tube is usually empty, but on cutting down to where it narrows we soon come to the more recent victims, and some interesting moths in fairly good condition were secured in this way. *Agrotis ypsilon* was the largest living moth observed. Not infrequently two or three large beetles would be found,